

## Personal information

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Biological systems do not operate in isolation, so we need interdisciplinary approaches to understand them. At the same time, the ever-expanding body of knowledge demands increased specialization. This tension between generalist and specialist knowledge has defined me as a scientist. Over the years, I intentionally immersed myself in three interrelated fields: **membrane biochemistry (PhD)**, **neurobiology (postdoc)**, and **immunology (PI)**. This has enabled me to develop specialist expertise and to apply techniques across scientific boundaries and connect distinct research domains. My background has enabled me to pursue a unique and explicitly interdisciplinary research line: the development and application of advanced microscopy techniques and chemical tools to solve problems related to membrane biology. My research aims to bridge the gap between fundamental cell biology and medical research, and ultimately to develop medical applications.

## Education and work experience

- 2018 – present** Full Professor at the University of Groningen and UMCG, the Netherlands  
 Research department: Molecular Immunology  
 Research topic: Membrane trafficking in immune cells  
 My research group currently consists of 2 post-docs, 4 PhD students and 1 technician
- 2012 – 2021** Assistant Professor at the Radboud Institute for Molecular Life Sciences, Radboud UMC, Nijmegen, the Netherlands  
 Research department: Tumor Immunology  
 Research topic: Membrane trafficking in immune cells
- 2008 – 2012** Postdoctoral fellow at the Max Planck Institute for Biophysical Chemistry, Göttingen, Germany  
 Funded by a long-term postdoctoral fellowship of the Human Frontier Science Program (HFSP)  
 Research group: Neurobiology  
 Group leader: Prof. Dr Reinhard Jahn
- 2004 – 2008** PhD degree in biochemistry at the University of Groningen, *cum laude* (top 5%)  
 Research group: Biochemistry / Membrane Enzymology  
 Group leader: Prof. Dr Bert Poolman  
Thesis: *On the mobility of biomolecules: a fluorescence microscopy approach*
- 1999 – 2004** MSc degree in molecular biology at the University of Groningen, *cum laude* (top 5%)

**5 selected publications**

Total publications: >80; total citations: >5000; h-index: 34 ([Google Scholar](#)). [Full publication list](#).

P.T.A. Linders, E. Gerretsen, A. Ashikov, M.A. Vals, N.H. Revelo, R. Arts, M. Baerenfaenger, F. Zijlstra, K. Huijben, K. Raymond, K. Muru, O. Fjodorova, S. Pajusalu, K. Öunap, M. ter Beest, D. Lefeber, & [G. van den Bogaart](#). New genetic disorder caused by starting site-specific variant in syntaxin-5. *Nature Communications*. (2021) 12: 6227. **(corresponding author)**

Funded by an NWO Vidi grant (2015–2020), we identified a human disorder caused by a single missense substitution in the second starting methionine of the gene coding for the SNARE protein syntaxin-5 (M55V), resulting in complete loss of the short isoform. Patients suffer from an early fatal multisystem disease, including severe liver disease, skeletal abnormalities and abnormal glycosylation. We found that both the short and long forms of the SNARE protein are essential for proper ER-Golgi trafficking. This is the first time that a mutation in an alternative starting codon has been related to human disease.

D.R.J. Verboogen, N. González Mancha, M. ter Beest, & [G. van den Bogaart](#). Fluorescence lifetime imaging microscopy reveals rerouting of SNARE trafficking driving dendritic cell activation. *eLife*. (2017) 6: e23525. **(corresponding author)**

Funded by an ERC Starting grant (2013–2018), my laboratory invented a new technique for the quantitative visualization of SNARE-complexes in living cells with organellar resolution. This is an important new technique in the membrane trafficking field. I was invited to record a protocol video for the Journal of Visualized Experiments and present my technique at the Quantitative BioImaging Conference (Rennes, France, 2019) and at the International Symposium on Chromaffin Cell Biology (Chennai, India, 2020). 24 citations.

I. Dingjan, D.R. Verboogen, L.M. Paardekooper, N.H. Revelo, S.P. Sittig, L.J. Visser, G.F. Mollard, S.S. Henriët, C.G. Figdor, M. ter Beest, & [G. van den Bogaart](#). Lipid peroxidation causes endosomal antigen release for cross-presentation. *Sci. Rep.* (2016) 6: 22064. **(corresponding author)**

Funded by an NWO Vidi grant (2015–2020), my laboratory uncovered a novel cellular mechanism for antigen cross-presentation by dendritic cells to cytolytic T cells, challenging the general conception that antigen translocation from endosomes into the cytosol is mediated by a protein transporter. The mechanism is now generally accepted and has been incorporated in multiple authoritative reviews. 104 citations.

[G. van den Bogaart](#), K. Meyenberg, H.J. Risselada, H. Amin, K.I. Willig, B.E. Hubrich, M. Dier, S.W. Hell, H. Grubmüller, U. Diederichsen, & R. Jahn. Membrane protein sequestering by ionic protein-lipid interactions. *Nature*. (2011) 479: 552–555. **(first author)**

This study shows that domains in the plasma membrane of SNARE-proteins are mediated by electrostatic interactions with phosphoinositide lipids. I designed this study, conducted most of the experiments and wrote the first version of the manuscript. This study was discussed by the Faculty of 1000. I was invited to present this work at several international meetings, including the MPI Nanoscopy Meeting (Ringberg, Germany, 2013). 517 citations.

[G. van den Bogaart](#), M.G. Holt, G. Bunt, D. Riedel, F.S. Wouters, & R. Jahn. One SNARE complex is sufficient for membrane fusion. *Nat. Struct. Mol. Biol.* (2010) 17: 358–354. **(first author)**

This study showed that a single SNARE complex is sufficient for membrane fusion – earlier studies gave estimates of 3–15 complexes. This finding helps to explain the high speed of neurotransmitter release, and the very low densities of most endosomal SNAREs. This study was discussed by the Faculty of 1000. I was invited to present this work at the Lund University Diabetes Symposium (Malmö, Sweden, 2012). 288 citations..

**Academic staff supervision**Ph.D. students

**2021 – present:** Melina Ioannidis, Muwei Jiang; **2020 – present:** Myrthe Frans, Alexine de Wit; **2017 – present:** Sjors Maassen; **2018 – present:** Femmy Stempels; **2017 – 2021:** Dr Elke Muntjewerff (currently postdoc at Uppsala University, Sweden); **2016 – 2021:** Dr Peter Linders (currently application specialist at PamGene); **2014 – 2018:** Dr Maxim Baranov (currently scientist at Janssen Pharmaceuticals); **2014 – 2019:** Dr Laurent Paardekooper (currently postdoc at Leiden University Medical Center, Netherlands);

**2013 – 2018:** Dr Danielle Verboogen (now Clinical Chemist, Tilburg, Netherlands); **2013 – 2018:** Dr Ilse Dingjan (currently postdoc at University Medical Center Utrecht, Netherlands); **2012 – 2016:** Dr Malou Zuidscherwoude (co-supervisor; currently postdoc at Birmingham University, UK ); **2012 – 2015:** Dr Zohreh Farsi (co-supervisor; Otto Hahn Medal for best PhD thesis; currently postdoc at Max Delbrück Center, Germany); **2012 – 2015:** Dr Dragomir Milovanovic (co-supervisor; currently independent group leader at The German Center for Neurodegenerative Diseases, Germany)

## Postdocs

**2019 – present:** Dr Deepti Dabral; **2018 – present:** Dr Harry M. Warner; **2018 – 2021:** Dr Maxim Baranov (currently scientist at Janssen Pharmaceuticals); **2016 – 2021:** Dr Frans Bianchi (funded by a VENI grant from the Netherlands Organisation for Scientific Research (NWO) and an Off Road grant from ZonMW; currently PI at University of Groningen); **2015 – 2021:** Dr Richèl Bilderbeek (currently postdoc at Uppsala University, Sweden); **2015 – 2021:** Dr Natalia Revelo Nuncira (funded by a VENI grant from the Netherlands Organisation for Scientific Research (NWO))

## Invited lectures (selection; last 5 years)

- 2022**     ▪ 21rd International Symposium for Chromaffin Cell Biology (Hamburg, Germany)
- 2021**     ▪ 23rd International Symposium on Regulatory Peptides (Acapulco, Mexico; online due to COVID-19)
- 2020**     ▪ International ITU Molecular Biology and Genetic Student Congress 2020 (Istanbul, Turkey; online due to COVID-19)
- 20<sup>th</sup> International Symposium for Chromaffin Cell Biology (Chennai, India)
- 2018**     ▪ Vision talk at MPI Junior Group Symposium (Palac Brunow, Poland)
- 2018**     ▪ 12th Annual Graduate Student Association Symposium of the Medical Research Council Laboratory of Molecular Biology (MRC-LMB; Cambridge, UK)
- 2018**     ▪ 62nd Annual Meeting of the Biophysical Society (San Francisco, California, USA)
- 2017**     ▪ Sanquin Research Seminars (Amsterdam, the Netherlands)
- 2017**     ▪ 19th International Symposium on Chromaffin Cell Biology (Sheffield, UK)
- 2017**     ▪ The Jackson Laboratory for Genomic Medicine (Farmington, Connecticut, USA)
- 2016**     ▪ Invited chair for Biomembrane Days (Berlin, Germany)

## Grants, fellowships and awards

- 2022 – 2026**     ▪ HTRIC Health Technology Innovation grant. Title: Early detection of sepsis using reactive oxygen species (~250,000€; with Prof. Dr Romana Schirhagl and Dr Hjalmar Bouma, M.D.)
- 2021 – 2026**     ▪ Open Competition Grant from ZonMW. Title: Engineering the next generation of dendritic cell vaccine immunotherapies (680,000€; with Prof. Dr S.I van Kasteren, Leiden University; Dr M. Verdoes, Dr G. Schreibelt and Prof. Dr I.J.M. de Vries, Radboud UMC)
- 2020 – 2025**     ▪ Consolidator Grant from the European Research Council (ERC). Title: Pathogen oriented SNARE trafficking for immune tailoring (2,000,000€)
- 2020 – 2021**     ▪ European Proteomics Infrastructure Consortium grant (EPIC-XS). Title: Phosphoproteomics for pathogen-induced rerouting of intracellular trafficking in antigen presenting cells (proteomics access; with Dr H.M. Warner).
- 2018 – 2021**     ▪ Young Investigator Grant from the Human Frontier Science Program (HFSP). Topic: Active morphological colloids for probing and tailoring intracellular antigen processing (1,050,000USD; with Dr S. Thutupalli (Tata Institute, India) and Se S. Sacanna (New York University))
- 2017 – 2021**     ▪ Junior Researcher Grant from Radboud UMC. Title: Unraveling the role of autophagy in antigen cross-presentation (1 fully funded PhD student)
- 2015 – 2020**     ▪ VIDI grant from the Netherlands Organisation for Scientific Research (NWO). Topic: Activation of the immune system (NWO; 800,000€)
- 2015 – 2018**     ▪ Awarded Young Principal Investigator (jPI) by the Radboud UMC (57,000€ / year)

- 2014 – 2018     ▪ Research grant from the Institute for Chemical Immunology (ICI). Topic: etiology of systemic sclerosis (610,000€; with Prof. Dr T. Radstake, M.D.; Utrecht University)
- 2014 – 2017     ▪ Career Development Award from the Human Frontier Science Program (HFSP). Topic: intracellular trafficking of MHC-antigen complex to the immunological synapse (300,000USD)
- 2013 – 2018     ▪ Starting Grant from the European Research Council (ERC). Title: membrane partitioning of homologous proteins (1,500,000€)
- 2012             ▪ Heineken Young Scientist Award for Biochemistry and Biophysics. Personal early career achievement award from the Royal Dutch Academy of Sciences (KNAW; 10,000€)
- 2012 – 2017     ▪ Hypatia Tenure-Track Research Fellowship from the Radboud UMC (800,000€)
- 2009 – 2012     ▪ Long Term Postdoctoral Fellowship from the Human Frontier Science Program (HFSP; 3 years post-doc salary)
- 2009             ▪ H.G.K.Westenbrink Prize. Personal award for best Ph.D. thesis in biochemistry and molecular biology from the Dutch Society of Biochemistry and Molecular Biology (1,500€)
- 2004             ▪ Dutch Society Prize for Young Talent. Personal award for best master’s research in biochemistry from the Royal Dutch Society of Sciences (10,000€)

## Other academic and professional activities (selection)

- 2016 – present   Member of evaluation committee for Netherlands Organisation for Scientific Research (NWO) Domain Science (funding schemes: TOP/ECHO, VENI and M)
- 2020 – present   Editorial Board Member for Membranes and Review Editor for Frontiers in Physiology
- 2019 – present   Valorization activity: guest lessons to primary school pupils. Topic: Infections
- 2019             Valorization activity: external expert in molecular biology for “Het Compendium de Geneeskunde” (Compendium of Medicine)
- 2016 – 2018     Member of the RIMLS internal advisory board (IAB). The IAB advises the RIMLS Scientific Director regarding short- and long-term research strategy, Ph.D. program, national and international collaborations and visibility of the institute.
- 2014 – 2020     Member of the Institute for Chemical Immunology (ICI) funded by a Gravitation Grant from the Netherlands Organisation for Scientific Research (NWO). The ICI aims to develop new chemical tools to combat disease.
- 2014 – present   Ad-hoc reviewer for funding organizations: European Research Council (ERC), French National Research Agency (ANR); Deutsche Forschungsgemeinschaft (DFG); Marsden Fund Council, New Zealand; Flanders Research Foundation (FWO); Medical Research Council (MRC)
- 2012 – present   Ad-hoc reviewer for various scientific journals: *Proc. Natl. Acad. Sci. USA.*, *J. Lipid Res.*, *Biophys. J.*, *Sci. Rep.*, *J. Inv. Med.*, *J. Cell Sci.*, *eLife*, *Cells*, *Nature Comm.*
- 2014             Guest editor of *Frontiers Mem. Phys. Biophys.* review topic issue “Membrane microdomains as new drug targets”. See: *Front. Physiol.* 6: 172.
- 2009 – present   Developer of IP3toICS software. This free software allows construction of fluorescence lifetime microscopy images from photon traces recorded with PicoQuant counting cards. This software is used by research groups worldwide (US, UK, Germany, France)

Memberships: the Dutch Society for Immunology (NVVI), the Netherlands Society for Biochemistry and Molecular Biology (NVBMB), Skepsis (Dutch organisation dedicated to the promotion and practice of scientific skepticism), Society Against Quackery (Vereniging tegen de Kwakzalverij)

## Teaching (selection)

- 2019 – present   Member of the Board of Examiners for Chemistry and Life Sciences and Technology, University of Groningen;
- 2019 – present   Coordinator of 5 ECTS BSc course “Immunology”, 6 ECTS BSc course “UCG Human

- Immunology”; 6 ECTS BSc course “Mammalian Cell Biology” and 5 ECTS BSc course “Human Immunology” at the University of Groningen;
- 2016** Professional teaching qualification (BKO) for theoretical and practical education;
- 2012 – present** Lecturer in medicine and biology BSc and MSc programs at Radboud UMC and University of Groningen. Courses: cell biology, optical microscopy, immunology;
- 2005 – present** Supervision of a total of 40 internships (BSc and MSc students);
- 2016 – 2018** Member of the Radboud Interdisciplinary Honours Programme advisory board. The board advises the program director of the Radboud Honours Academy regarding short- and long-term education strategy;
- 2015 – 2018** Coordinator of 12 ECTS B.Sc. course “Visualizing Health and Disease: from Molecule to Man”, 3 ECTS M.Sc. course “Molecular Biology 2: Edit your own gene”, and extracurricular course “The rising costs of cancer therapies”.